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**Declarations under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AI, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: GLP-1 FUSION PROTEINS

(57) Abstract: The present invention relates to glucagon-like-1 compounds fused to proteins that have the effect of extending the in vivo half-life of the peptides. These fusion proteins can be used to treat non-insulin dependent diabetes mellitus as well as a variety of other conditions.

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## INTERNATIONAL SEARCH REPORT

International Application No.  
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## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07K14/605 C07K14/765 C12N15/62 A61K38/38 A61K38/26  
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According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, MEDLINE, CHEM ABS Data, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 00 69911 A (ARCHEVEQUE BENOIT L ; CONJUCHEM INC (CA); LEBLANC ANOUK (CA); HOLME) 23 November 2000 (2000-11-23) claims the whole document	1-50
A	KNUDSEN LOTTE B ET AL: "Potent derivatives of glucagon-like peptide-1 with pharmacokinetic properties suitable for once daily administration." JOURNAL OF MEDICINAL CHEMISTRY, vol. 43, no. 9, 4 May 2000 (2000-05-04), pages 1664-1669, XP002222050 ISSN: 0022-2623 the whole document	1-50



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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## INTERNATIONAL SEARCH REPORT

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0069911	A	23-11-2000	AT 226593 T 15-11-2002
		AU 4774800 A 05-12-2000	
		AU 4855500 A 05-12-2000	
		AU 5027100 A 05-12-2000	
		AU 5139300 A 05-12-2000	
		BR 0010750 A 26-02-2002	
		BR 0010757 A 19-02-2002	
		CN 1350548 T 22-05-2002	
		CN 1351611 T 29-05-2002	
		EP 1171582 A2 16-01-2002	
		EP 1180121 A1 20-02-2002	
		EP 1179012 A1 13-02-2002	
		EP 1105409 A2 13-06-2001	
		WO 0070665 A2 23-11-2000	
		NO 20015584 A 03-01-2002	
		WO 0069911 A1 23-11-2000	
		WO 0069900 A2 23-11-2000	
		WO 0069902 A1 23-11-2000	
		US 6329336 B1 11-12-2001	
		US 2002049153 A1 25-04-2002	

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